Analele Universităţii din Craiova. seria Agricultură – Montanologie – Cadastru (Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series) Vol. XLVI 2016

STUDIES ON THE BIOLOGY AND ECOLOGY THE HORSE -CHESTNUT LEAF MINER *CAMERARIA OHRIDELLA* DESCHKA-DIMIČ

Floricel (Niculescu)Marilena[1], Mitrea Ion[2]
PhD University of Craiova, e-mail : marilena_niculescu@yahoo.com
[2] University of Craiova, Faculty of Horticulture,

key words: ***cameraria ohridella, biology, ecology***

ABSTRACT

Lately, the aesthetic value of the green areas in Caracal has been seriously by a pest, chestnut leaf miner moth -Cameraria ohridella Deschka-Dimić which affects the leaves of the ornamental chestnut – Aesculus-hipocastanum.

In order to decrease the effects and to prevent the damages produced by this pest, it is required to know its biology, to assess the level of populations, to detect the directions in population dynamics.

In 2016 climatic conditions of Caracal, the insect had 4 generations, the fifth generation being incomplete: egg,larva, pupa.

The sequence of generations was studied by observing the emergence of new mines that are small, dense with whitish-greenish epidermis and they are different from old larger ones, with brownish-rust epidermis.

INTRODUCTION

In an increasingly industrialised and urbanised a world, green areas have great importance, being a place of relaxation, recreation, where persons could return to nature.

It is well known the importance of green areas for the improvement of the air quality we breathe, through the oxygen contribution brought by plants.

Green areas provide a range of functions owing to the various tree species they contain. Trees create decorative effects by appearance, color, leaf shape (Purcelean Del., Cocalcu T., 1969).

Aesculus hippocastanum L. is a tree frequently grown throughout the green areas whose leaves are infested with ornamental chestnut mining moth - Cameraria ohridella Deschka-Dimić.

Aspects of insect biology were published by Deshka (1993), Butin and Fuhrer (1994), Wipking (1998) and in our country by Perju et al. (2000 - 2003), Oltean I. et al. (2006)

MATERIAL AND METHOD

In order to establish the biological cycle, in 2016, from the central park of Caracal, were collected samples from the infested leaves during the first half of May until October and the leaves were kept in laboratory and were analyzed to determine the stages of development of the species studied (fig.1).

During each observation, it was determined the development stage of biological reserve: larvae, pupae, adults correlated with development phase of host plant the evolution of climatic factors.

Based on catches performed with traps of 37-atraCAM sexual attractant pheromones placed on 29.04.2016 adults' flight curve was studied. Traps reading was performed weekly. Pheromone capsules were changed after six weeks.

Fig. 1. Leaves kept in laboratory conditions (orig.)

RESULTS AND DISCUSSIONS

During the growing season of Aesculus L. hipocastanum ornamental chestnut trees, depending on the area and climatic conditions, the insect may have 3 to 5 generations per year (Lethmayer C., G. Grabenweger, 2002).

Researches in the northern area of our country conducted by Perju T. et al. 2003, Oltean et al., 2006; Dombi. O. P. 2012, revealed that the insect has 3 - 4 generations per year depending on the evolution of the climate.

In 2016 in Caracal area, chestnut leaf miner moth has developed 4 generations (the fifth generation being incomplete: egg, larva, pupa).

Hibernating adult generation appeared in early May on 05.05.2016. During the warmer days adults fly in zigzag direction and more intensely, adults swarms are often seen around trees (Oltean I., 2005).

Adult mating occurs shortly after their arrival. Eggs are deposited in small caves on the underside of the lamellae between the leaves nervures. A female lays 20-40 eggs (according to Wipking 1998, up to 100 eggs). Incubation lasts 2 to 3 weeks.

Hibernal generation has a 10 days duration of incubation stage of the egg, May having an average temperature of 16.2ºC, the first generation of 15 days at an average temperature of 22.7ºC, the second generation of 19 days at an average temperature of 24.8ºC, the third generation of 12 days at an average temperature of 24.0ºC, and the fourth generation of 7 days at an average temperature of 19.8ºC (table 1).

After hatching, the larvae penetrate the are between the leaf epidermis and start feeding, at the beginning forming round mines which then extend to an irregular shape, as reported on 15th May, 12 days after the flight begun.

Larva having reached full development builds a silky cocoon like as a silky net under which it turns into pupa.

Pupa is located in a silky cocoon of net shape (fig. 3). It is of obtect type, has a brown body and 5-6 mm length. Pupa stage lasts 8 to 10 days (summer generations it takes 7 to 8 days). Pupa stage lasts for hibernating generation of 10 days, 10 days for the first generation, second generation 6 days, and 6 days for the third generation.

Table 1

***Cameraria ohridella* Deschka-Dimić species life cycle (2016, Caracal)**

Stage of development	Year 2016	The average monthly temperature (°C)
Emergence of hibernating adult generation (maximum flight)	05.05 (17.05)	16.2
Beginning egg period	04.05	
Larvae (first mines)	15.05	
Emergence of fist pupae	27.05	
Emergence of 1st generation adults (maximum flight)	06.06 (19.06)	22.7
Beginning of eggs period	07.06	
Larvae	23.06	
Pupae	04.07	24.8
Emergence of 2nd generation adults (maximum flight)	15.07 (30.07)	
Beginning of eggs period	16.07	
Emergence of larvae	05.08	24.0
First pupae	21.08	
Emergence of 3rd generation adults (maximum flight)	27.08 (04.09)	
Beginning of eggs period	28.08	
Emergence of larvae	10.09	19.8
First pupae	15.09	
Emergence of 4th generation adults (maximum flight)	21.09 (23.09)	
Beginning of eggs period	21.09	
Emergence of larvae	28.09	
First pupae	09.10	

Larvae feces can be seen through the semi-transparent epidermis as dark brown spots (fig. 2).

Fig. 2. Cameraria ohridella Deschka-Dimić larvae that produced round and irregular mines (orig.)

The adult (butterfly) leaves the silky cocoon and then the leaf through the upper epidermis and after that it flies (fig. 4).

Fig. 3. Cameraria ohridella Deschka-Dimić pupa (orig)

Fig. 4. Cameraria ohridella Deschka-Dimić adults perforating the upper epidermis (orig.)

Length of adult stage was of 32 days at hibernating generation, 39 days for the first generation, 43 days for the second generation, 25 days for the third generation and 12 days for the fourth generation.

CONCLUSIONS

In 2016 climatic conditions of Caracal, the insect had 4 generations, the fifth generation being incomplete: egg,larva, pupa.

The sequence of generations was studied by observing the emergence of new mines that are small, dense with whitish-greenish epidermis and they are different from old larger ones, with brownish-rust epidermis.

Adult capture was performed using pheromone traps with 37-atraCAM specific sexual attractants pheromone in order to perform the flight curve.

BIBLIOGRAPHY

1. **Butin H., Führer E.,**1994, *Kastanien-Minisrmotte(Cameraria ohridella Deschka-Dimić)ein neuer chädling an Aesculus hippocastanum*, Nachrichtenblatt des Deutschen Pflanzenschutzdienstes,46 (5).

2. **Deschka G.,** 1993, *Die miniermotte Deschka-Dimić eine Gefahr fur die Rosskastanien Aesculus hippocastanum L. (Insecta, Lepidoptera, Lithocolletidae)*, Linzer biol. Beitr., 25/1,141-148.

3. **Dombi Ö. P.,** 2012, *"Studies regarding the landscape design pestsin Covasna (monitoring, morphology, bioecology and control)",PhD Thesis*, USAMV Cluj-Napoca.

4. **Lethmayer C., G. Grabenweger,** 2002, *Efects of temperature and relative humidity on the mortality of overwintering pupae from Cameraria ohridella (Lep., Gracillariidae),*VII th European Congress of Entomology, Greece.
5. **Oltean I.,** 2005, *Special entomology. Forest pests,* Academic Press Publishing house, Cluj-Napoca.
6. **Oltean I.,T. Perju, I. Ghizdavu, H. Bunescu, Ilonka Bodiș, Lucia Gânscă, I. Oprean, Irina Ciotlăuș, Sanda Maxim,** 2006, horse-chestnut leaf miner moth *Cameraria ohridella Deschka-Dimič*, Academic Press Publishing house, Cluj-Napoca.
7. **Perju T., Ilonka Botdiș, V. Bozul, I. Oprean,** 2003, dynamics of mining population *(Cameraria ohridella Deschka-Dimić), on the ornamental chestnut (Aesculus hippocastanum L.) according to the conditions in Cluj Napoca and the persepctives of its extinction in the territory*, ”Ion Borcea” Bacău Natural Sciences Museum Complex, Studies and Communications 2000-2003, 18, ”Ion Borcea” Bacău Publishing house.
8. **Purcelean Șt., T. Cocalcu,**1969, *Growth of ornamental woody species,* Agrosilvic Publishing house, Bucharest.
9. **Wipking W.,** 998 *Die Rosskantanien miniermotten Cameraria ohridella (Deschka-Dimić)*, 1986, eine Schmetterlingsart im Rhimeland (*Lep.,Gracilariidae*), Melanargia,10, (4).